International Conference on Radioecology and Environmental Radioactivity.
19-24 June 2011-Hamilton, Ontario, Canada.

Abstract.

Estimation of external radiation doses of the population from the Chernobyl-origin short-lived and medium-lived radionuclides in the contaminated areas of the Kaluga region

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On 26 April 2011 we marked 25 years after the Chernobyl accident. Over the years since then, specialists of different agencies involved in dealing with the Chernobyl accident consequences have obtained data required for estimating radiation doses for the population, as well as effects of this exposure on different population groups. However, in estimating contributions to external radiation exposure for the population, some assumptions regarding the actual isotope composition in soils of the contaminated settlements were used. This work aims to estimate the contribution of the Chernobyl-origin short-lived and medium-lived isotopes to the external radiation dose of the population based on systematization and analysis of all available experimental and calculation data about the radioactive contamination of the Kaluga region settlements. Table 1 shows data on the mean soil contamination in the worst contaminated settlements of the Kaluga region.

Table 1. Soil contamination in the settlements, as of the fallout date 29.04.1986, Ci/km^2.

Settlement	^{131}I	^{133}I	^{132}Te+ ^{132}I	^{99}Mo	^{239}Np	^{140}La + ^{140}Ba	^{95}Zr+ ^{95}Nв	Cs^{136}	^{103}Ru	^{134}Cs	^{137}Cs
Zhizdra	42,0	12,6	131	0,3	1,4	5,6	0,25	37	10,2	3,7	3,7
Mileyevo	51,3	15,4	161	1,2	5,6	10,0	1,0	45	10,2	4,4	4,4
Kolodyassy	67,3	20,3	211	1,2	5,6	11,0	1,0	59	15,8	6,0	6,0

The calculations have shown that the contribution of the short-lived and medium-lived isotopes, on the average, was 80% in the first year after the accident, 40 % during 2-10 years after the accident and 37% during 11-15 years after the accident. The major contributors to the external radiation dose in the first year after the accident were ^{134}Cs,^{136}Cs,^{132}Te+^{132}I,^{140}Ba+^{140}La. In the second time period, the external radiation was due to ^{134}Cs and ^{137}Cs and it was almost totally due to ^{137}Cs in the third period.